

## CLAIMS

What is claimed is:

1. A priming mixture for small arms ammunition comprising:

5 a primary explosive; and

a non-hygroscopic, non-corrosive oxidizer system comprising bismuth oxide.

2. The priming mixture of claim 1, wherein the primary explosive comprises a compound selected from trinitroresorcinol, dinitrobenzofuroxan, diazodinitrophenol and combinations  
10 thereof.

3. The priming mixture of claim 1, wherein the oxidizer system further comprises a secondary oxidizer selected from zinc peroxide, manganese dioxide, molybdenum trioxide, strontium nitrate, strontium peroxide, tin oxide, iron oxide and combinations thereof.  
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4. The priming mixture of claim 1, and further comprising a gas producing agent.

5. The priming mixture of claim 4, wherein the gas producing agent is selected from pentaerythritol tetranitrate, trinitrotoluene and combinations thereof.  
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6. The priming mixture of claim 1, and further comprising a reducing agent.

7. The priming mixture of claim 6, wherein the reducing agent is selected from aluminum, boron, calcium silicide, magnesium, magnesium-aluminum alloy, silicon, titanium, tungsten, zirconium, nitrocellulose and combinations thereof.

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8. The priming mixture of claim 1, wherein the priming mixture is substantially free of lead.

9. The priming mixture of claim 1, wherein the priming mixture is non-toxic.

10 10. A small arms ammunition cartridge comprising:  
a case; and,  
the priming mixture of claim 1 disposed in the case.

11. A priming mixture for small arms ammunition comprising:  
15 about 20% to about 70% by weight of a primary explosive;  
about 10% to about 70% by weight of an oxidizer system comprising bismuth oxide;  
about 0% to about 25% by weight of a gas producing agent;  
about 0% to about 20% by weight of a sensitizer; and,  
about 0% to about 20% by weight of a reducing agent.

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12. The priming mixture of claim 11, wherein the priming mixture comprises about 25% to about 50% by weight of the primary explosive.

13. The priming mixture of claim 11, wherein the priming mixture comprises about 25% to about 55% by weight of the oxidizer system.

14. The priming mixture of claim 11, wherein the priming mixture comprises about 5% to about 25% by weight of the gas producing agent.

15. The priming mixture of claim 11, wherein the priming mixture comprises about 5% to about 20% by weight of the sensitizer.

16. The priming mixture of claim 11, wherein the priming mixture comprises about 5% to about 20% by weight of the reducing agent.

17. The priming mixture of claim 11, wherein the primary explosive comprises a compound selected from trinitroresorcinol, diazodinitrophenol, dinitrobenzofuroxan and combinations thereof.

18. The priming mixture of claim 11, wherein the oxidizer system further comprises a secondary oxidizer selected from potassium nitrate, zinc peroxide, manganese dioxide,

molybdenum trioxide, strontium nitrate, strontium peroxide, barium nitrate, tin oxide, iron oxide and combinations thereof.

19. A priming mixture of claim 11, wherein the oxidizer system is non-hygroscopic.

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20. The priming mixture of claim 11, wherein the priming mixture is substantially free of lead.

21. The priming mixture of claim 11, wherein the priming mixture is non-toxic.

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22. A small arms ammunition round comprising:  
a priming mixture as disclosed in claim 11;  
a propellant adapted to be initiated by the priming mixture; and  
a projectile.

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23. A method of making a priming mixture for small arms ammunition comprising:  
forming an aqueous priming mixture by combining and mixing water with, on a dry weight percent:

about 20% to about 70% by weight of a primary explosive;

20 about 10% to about 70% by weight of an oxidizer system comprising bismuth oxide;

about 0% to about 25% by weight of a gas producing agent;

about 0% to about 20% by weight of a sensitizer; and,

about 0% to about 20% by weight of a reducing agent.

24. The method of making the priming mixture of claim 23, further comprising pelletizing

5 the aqueous priming mixture.

25. The method of making the priming mixture of claim 24, further comprising charging a percussion cup with the palletized priming mixture to form a charged percussion cup.

10 26. A method of making a priming mixture for small arms ammunition comprising:

forming an aqueous priming mixture by combining and mixing water with,

a primary explosive; and,

a non-hygroscopic, non-corrosive oxidizer system comprising bismuth oxide.

15 27. The method of making the priming mixture of claim 26, further comprising pelletizing

the aqueous priming mixture.

28. The method of making the priming mixture of claim 27, further comprising charging a

percussion cup with the palletized priming mixture to form a charged percussion cup.

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29. The method of making the priming mixture of claim 26, further comprising

combining and mixing a sensitizer with the aqueous priming mixture.

30. The method of making the priming mixture of claim 26, further comprising combining and mixing a reducing agent with the aqueous priming mixture.

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31. The method of making the priming mixture of claim 26, further comprising combining and mixing a gas producing agent with the aqueous priming mixture.

32. A priming mixture for small arms ammunition comprising:

10 about 25% to about 50% by weight of a primary explosive; and,  
about 25% to about 55% by weight of an oxidizer system comprising bismuth oxide.

33. The priming mixture of claim 32, further comprising about 5% to about 25% by weight of a gas producing agent.

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34. The priming mixture of claim 33, wherein the gas producing agent is selected from pentaerythritol tetranitrate, trinitrotoluene and combinations thereof.

35. The priming mixture of claim 32, further comprising about 5% to about 20% by weight of  
20 a sensitizer.

36. The priming mixture of claim 35, wherein the oxidizer system is non-corrosive and non-hygroscopic.

37. The priming mixture of claim 32, further comprising about 5% to about 20% by weight of  
5 the reducing agent.

38. The priming mixture of claim 37, wherein the reducing agent is selected from aluminum, boron, calcium silicide, magnesium, magnesium-aluminum alloy, silicon, titanium, tungsten, zirconium and combinations thereof.

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39. The priming mixture of claim 32, wherein the primary explosive comprises a compound selected from trinitroresorcinol, dinitrobenzofuroxan, diazodinitrophenol and combinations thereof.

15 40. The priming mixture of claim 32, wherein the oxidizer system further comprises an oxidizer selected from potassium nitrate, zinc peroxide, manganese dioxide, molybdenum trioxide, strontium nitrate, strontium peroxide, barium nitrate, tin oxide, iron oxide and combinations thereof.

20 41. The priming mixture of claim 32, wherein the priming mixture is substantially free of lead.